

18. EFFECT OF HOSTS ON THE PARASITE *BRACHYMERIA LASUS* (WALKER)

*Brachymeria lasus* (Hymenoptera: Chalcididae) is an insect parasite of the pupal stage of many butterflies and moths. During the course of our studies on the host-parasite relationships of this parasite we noted that the parasitised host is capable of exerting an influence on the morphology, physiology and behaviour of the adult *B. lasus* emerging from it.

The effect of hosts on the size of the parasite was found to be the most obvious influence. When the amount of food provided by the host is not adequate but just sufficient to enable the parasite to complete its development, the parasite emerges as a dwarf but normal individual. Comparatively small *Nephantis serinopa* pupae (measuring 9-12 mm in length) when parasitised by *B. lasus* gave rise to relatively smaller individuals of *B. lasus* (measuring less than 3.5-4 mm in length) whereas comparatively larger *Plusia peponis* pupae (measuring 20-25 mm in length) gave rise to relatively larger individuals (measuring more than 4-4.5 mm). The quantity of nourishment provided by *Plusia peponis* pupae is more than the quantity required for the development of the parasite *B. lasus* and some excess tissue is left over at the posterior end of the host pupa after emergence of the adult parasite. An unduly high proportion of male *B. lasus* has been observed among the dwarf individuals produced by smaller sized host pupae (such as smaller *N. serinopa* pupae).

The probable reason for the production of high proportion of males and dwarfism among the individuals that emerged from relatively smaller hosts, may be the same as pointed out by Joseph (1958) in the case of the Fig-wasp parasite (Torymidae). According to

him the production of high proportion of males and the dwarfism in males of *Philotrypesis* is due to the partial starvation of the parasite larvae during development as a result of non-availability of adequate quantity of food. The same author referred to the observation of Grosch (1948) indicating that haploidy is the factor which permits the larval forms to survive better in partial starved condition. Consequently more of the males survived than the females (differential mortality of the sexes) and this resulted in a sex-ratio with higher proportions of males.

Certain physiological characteristics such as fecundity, longevity and vigour of *B. lasus* are influenced by its hosts through their effect on size. Smaller females of *B. lasus* emerging from small-sized hosts were found to be less active and less agile compared to the relatively large-sized individuals emerging from larger host pupae. Also these small-sized females laid comparatively fewer eggs than the large-sized individuals and in the smaller individuals mating was found delayed compared to large-sized individuals. The large-sized individuals were found to pierce the outer pupal cuticle of the host more easily with its ovipositor than the small-sized females. In the case of the Indian strain of *B. lasus*, the female could not succeed in thrusting its ovipositor through the hard cuticle of the pupa of *Papilio demoleus* in spite of repeated trials lasting over two minutes. However, there are instances of New Guinea specimens of *B. lasus* recorded as emerged from *Papilio aegaeus* indicating that the successful parasitization of its host by this strain of *B. lasus* may be due to its relatively larger size and probably stronger build than the Indian strain.

In view of these findings it would appear that if larger hosts are utilized for the breeding of *Brachymeria* parasites and for that matter for any mass breeding for biological control programmes, the larger sized individuals

produced would certainly have advantageous characters—morphological, physiological, as well as behavioural—enabling them more readily to parasitise their hosts.

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#### 19. A NOTE ON SEASONAL FLUCTUATION OF MIDGE POPULATION ON HYBRID SORGHUM CSH - 1

(With a text-figure)

Among the several insect-pests recorded infesting earheads of sorghum, the sorghum midge (*Contarinia sorghicola* Coquillet) is considered to be important. Karve (1967) observed heavy damage due to severe attack of the pest on CSH-1 and CSH-2 varieties in Rabi season. Dhumal (1967) reported heavy infestation in the same season. For an understanding of the incidence of the pest in three different seasons of the year, studies on the fluctuation of midge populations infesting hybrid sorghum CSH-1 were undertaken.

One hundred and fifty jowar earheads of variety CSH-1 were bagged with loose muslin cloth bags (33 cm × 16 cm, one side opened) just prior to emergence from boot. The technique used by Doering & Randolph (1963) was employed with little modification in the present experiment. Daily 10 earheads were

exposed for 24 hours and kept rebagged. Such fresh exposures were continued for 15 consecutive days so that the earheads up to milk stage were exposed for egg laying. The rebagged earheads were observed daily to note the number of adults flies that emerged. Similar experiments were conducted in Kharif, Rabi and summer seasons separately. The data on the total number of adults that emerged daily following earhead emergence in different seasons are presented in the figure.

#### RESULTS

It is evident from the graph that midges remained active in all three seasons of the year with varying intensity of infestation. The comparative activity of the pest was judged on the basis of adult emergence from exposed earheads. The intensity of the pest on the